

# Cruise Track from R/V Blue Heron BH07-09, BH07-17, BH07-19, BH08-01, BH08-11, BH08-19 in the Lake Superior from 2007-2008 (CARGO project)

Website: <https://www.bco-dmo.org/dataset/3641>

Version: 17 April 2012

Version Date: 2012-04-17

## Project

» [Primary Production and Grazing Dynamics In the Ultra-Oligotrophic Waters of Lake Superior](#) (CARGO)

## Program

» [Laurentian Great Lakes Ecosystem Studies](#) (Laurentian Great Lakes Ecosystem Studies)

Contributors	Affiliation	Role
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## Dataset Description

Cruise tracks generated from navlog files and NMEA strings  
Cruiseld, Date, Time, Lat, Lon, Water Depth

## Methods & Sampling

Logged aboard vessel as navlog files and/or NMEA strings

## Data Processing Description

Generated by BCO-DMO staff from navlog files and NMEA strings contributed by Robert Sternier and Zack Ruff

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## Data Files

<b>File</b>
<b>CARGO_CruiseTracks.csv</b> (Comma Separated Values (.csv), 177.01 KB) MD5:59ac3c108cc1567dec3d65c52bff1494
Primary data file for dataset ID 3641

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## Parameters

Parameter	Description	Units
CruiseId	Cruise Id	text
Date	Date (GMT)	YYYYMMDD
Time	Time (GMT)	HHMMSS
Latitude	Latitude Position (South is negative)	decimal degrees
Longitude	Longitude Position (West is negative)	decimal degrees
Depth_Water	Water Depth	meters

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## Instruments

<b>Dataset-specific Instrument Name</b>	Global Positioning System Receiver
<b>Generic Instrument Name</b>	Global Positioning System Receiver
<b>Generic Instrument Description</b>	The Global Positioning System (GPS) is a U.S. space-based radionavigation system that provides reliable positioning, navigation, and timing services to civilian users on a continuous worldwide basis. The U.S. Air Force develops, maintains, and operates the space and control segments of the NAVSTAR GPS transmitter system. Ships use a variety of receivers (e.g. Trimble and Ashtech) to interpret the GPS signal and determine accurate latitude and longitude.

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## Deployments

### BH07-09

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58792">https://www.bco-dmo.org/deployment/58792</a>
<b>Platform</b>	R/V Blue Heron
<b>Report</b>	<a href="http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/BH07-09_CARGO1_Synopsis.pdf">http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/BH07-09_CARGO1_Synopsis.pdf</a>
<b>Start Date</b>	2007-07-30
<b>End Date</b>	2007-08-01
<b>Description</b>	Cruise Name:CARGO 1 Dates: 30 July - 01 August 2007 Vessel: R/V Blue Heron UNOLS Cruise ID: BH07-09 (Not verified srg/13April2012) First cruise on Sea Grant project on production and grazing. The lake was stratified and a DCM was present. Participants: Sterner, Brovold, Seegers, Jeyasingh, and Stark

**BH07-17**

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58793">https://www.bco-dmo.org/deployment/58793</a>
<b>Platform</b>	R/V Blue Heron
<b>Report</b>	<a href="http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/BH07-17_CARGO2_Synopsis.pdf">http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/BH07-17_CARGO2_Synopsis.pdf</a>
<b>Start Date</b>	2007-10-05
<b>End Date</b>	2007-10-07
<b>Description</b>	Cruise Name:CARGO 2 Dates: 05 - 07 October 2007 Vessel: R/V Blue Heron UNOLS Cruise ID: BH07-17 (Not verified srg/13April2012) Participants: R. Sterner, et al

**BH07-19**

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58794">https://www.bco-dmo.org/deployment/58794</a>
<b>Platform</b>	R/V Blue Heron
<b>Report</b>	<a href="http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/BH07-19_CARGO3_Synopsis.pdf">http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/BH07-19_CARGO3_Synopsis.pdf</a>
<b>Start Date</b>	2007-11-07
<b>End Date</b>	2007-11-09
<b>Description</b>	Cruise Name:CARGO 3 Dates: 07 - 09 November 2007 Vessel: R/V Blue Heron UNOLS Cruise ID: BH07-19 (Not verified srg/13April2012) Participants: Sterner (Chief Scientist), Brovold, Seegers, Michelle McCrackin (ASU)

**BH08-01**

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58795">https://www.bco-dmo.org/deployment/58795</a>
<b>Platform</b>	R/V Blue Heron
<b>Report</b>	<a href="http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/BH08-01_CARGO4_Cruise_Outline.pdf">http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/BH08-01_CARGO4_Cruise_Outline.pdf</a>
<b>Start Date</b>	2008-04-29
<b>End Date</b>	2008-05-01
<b>Description</b>	Cruise Name:CARGO 4 Dates: 29 April - 01 May 2008 Vessel: R/V Blue Heron UNOLS Cruise ID: BH08-01 (Not verified srg/13April2012) Participants: R. Sterner, et al

**BH08-11**

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58796">https://www.bco-dmo.org/deployment/58796</a>
<b>Platform</b>	R/V Blue Heron
<b>Report</b>	<a href="http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/BH08-11_CARGO5_Cruise_Outline.pdf">http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/BH08-11_CARGO5_Cruise_Outline.pdf</a>
<b>Start Date</b>	2008-07-30
<b>End Date</b>	2008-08-01
<b>Description</b>	Cruise Name:CARGO 5 Dates: 30 July - 01 August 2008 Vessel: R/V Blue Heron UNOLS Cruise ID: BH08-11 (Not verified srg/13April2012) Participants: R. Sterner, et al

**BH08-19**

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58797">https://www.bco-dmo.org/deployment/58797</a>
<b>Platform</b>	R/V Blue Heron
<b>Report</b>	<a href="http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/BH08-19_CARGO6_Cruise_Outline.pdf">http://bcodata.whoi.edu/LaurentianGreatLakes_Chemistry/BH08-19_CARGO6_Cruise_Outline.pdf</a>
<b>Start Date</b>	2008-09-16
<b>End Date</b>	2008-09-18
<b>Description</b>	Cruise Name:CARGO 6 Dates: 16 - 18 September 2008 Vessel: R/V Blue Heron UNOLS Cruise ID: BH08-19 (Not verified srg/13April2012) Participants: R. Sterner, et al

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## Project Information

### Primary Production and Grazing Dynamics In the Ultra-Oligotrophic Waters of Lake Superior (CARGO)

**Website:** <http://www.tc.umn.edu/~stern007/>

**Coverage:** Lake Superior

### **PRIMARY PRODUCTION AND GRAZING DYNAMICS IN THE ULTRA-OLIGOTROPHIC WATERS OF LAKE SUPERIOR ("CARGO" which stands for CARbon Gain and IOss)**

All higher organisms including fish ultimately rely on carbon fixed by primary production for their growth. A major gap in our understanding of Lake Superior lies in a highly incomplete knowledge of the rates primary production and grazing in the lake's waters. This data gap impedes the progress of scientific understanding of the lake on many fronts. Primary production is the foundation for all food webs and is a large, perhaps the largest, term in the lake's carbon cycle. Over the years, there have been but a small handful of investigators who have measured primary production in this, Earth's largest lake by area. Attempts to construct comprehensive carbon budgets using literature values for major terms such as DOC import, sedimentation, etc. indicate a large imbalance in the C cycle in the lake. According to current best estimates, organic carbon disappears at much faster rate (14-40, Cotner et al. 2005) or (13-81, Urban et al. 2005) than its rate of input (5.3 Tg/y, Cotner et al. 2004) or (3-8 Tg/y, Urban et al. 2005) (all values in Tg/y). The budget is out of balance by a factor of about 2 to 27. Unless the lake is metabolizing vast quantities of old, "fossilized" carbon (implausible), current out-of-balance budgets must be wrong, meaning we do not have good estimates for one or more of these fundamental processes in the lake.

Of the possible terms in the carbon budget of the lake, a focus on primary production is appropriate because of the large magnitude of this term plus the dearth of actual measurements that have been performed and the many untested assumptions that lurk behind those few measurements. At the same time, a major loss of particulate organic carbon has been almost entirely ignored until now. That loss is the grazing rate, the rate of consumption of lake particles (including bacteria and algae) by living organisms in the water column. As Banse (2002) has described for the oceans, though physical mixing and sinking contribute to the dynamics of phytoplankton and other small planktonic organisms, it is principally production and grazing which determine dynamics. To a first approximation, the rate of change of phytoplankton is equal to the difference between production and grazing.

This project comprises a two-year study that will focus on primary production and grazing in the world's largest lake by area. Primary production will be measured using <sup>14</sup>C additions to shipboard incubations using a photosynthesizer device. P-I curves plus other data will be used as input for numerical models of areal production. Production numbers so obtained will be compared to in situ incubations. Grazing assays will be based on the dilution series methods developed by Landry and Hassett (1982) and since employed by many others, including myself and my students; this method provides an overall measure of in situ particle turnover.

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## Program Information

### Laurentian Great Lakes Ecosystem Studies (Laurentian Great Lakes Ecosystem Studies)

**Website:** <http://www.tc.umn.edu/~stern007/>

**Coverage:** Laurentian Great Lakes

A series of studies concerned with the chemistry and biology of the Laurentian Great Lakes. These different studies share a focus on the dynamics of organic pools of carbon, nitrogen and phosphorus, and the stoichiometric linkages among these elements. At different times, work also has focused on trace metal dynamics and interactions with biota, the rates of primary production and herbivory, rates and patterns of primary productivity, and the century-long, steady trend of increasing nitrate in Earth's largest lake by area. Microbial populations have been investigated and linked to these chemical properties.

This Program was created by BCO-DMO staff to bring various Laurentian Great Lakes Research projects under one umbrella for improved discovery and access.

Dates: 1998 - 2014

Funding: NSF/OCE and Minnesota Sea Grant

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## Funding

Funding Source	Award
Minnesota Sea Grant (MN Sea Grant)	<a href="#">unknown CARGO MN Sea Grant</a>

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